

AMENDMENTS TO THE SPECIFICATION

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The sole Figure Figure-1 is a schematic view of a fault monitor according to the present invention, illustrated in conjunction with a circuit for which fault monitoring is desired.

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The present invention provides a fault meter for testing for faults within an electrical circuit. Referring to the Figure 4, a typical electrical circuit 10 with which the present invention will be used is illustrated. The circuit 10 includes a power supply 12 connected through a switching device 14 to a load 16, and finally through a ground 18. The load 16 illustrated in the Figure 4 includes a plurality of bulbs 20, 22, 24 connected in parallel. The circuit 10 may represent, for example, a high mount stop light on a motor vehicle.

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The fault monitor 26 includes a power supply 36 connected to switching mechanism 38. A preferred switching mechanism includes a first transistor 40, which may in the illustrated example be a PNP transistor 40 having an entrance 42, input 44, and collector emitter 46. The power supply 36 may also be connected to a second transistor 48, which in the illustrated example is a digital NPN transistor having an entrance 50, an input 52, and an emitter 54. A pair of resistors 56, 58 are connected in series between the power supply 36 and the entrance 50 of the transistor 48. The input 44 of the transistor 40 is connected between the resistors 56, 58, thereby providing a voltage divide for the input 44. The resistors 56, 58 may, in some embodiments, provide resistance of about $1.0\text{ K }\Omega$ and about $4.7\text{ K }\Omega$, respectively. The input 52 is connected to a power source, for example, the switched 12-volt power supply 59. The emitter 54 is connected to a ground 61. When a positive potential is supplied from the power supply 59 to the input 52 of the transistor 48, current is permitted to flow from the power supply 36 to the ground 61. This current will provide a negative potential at the voltage divide between the resistors 58, 56, thereby providing a negative potential to the input 44 of the transistor 40, permitting current to flow therethrough from the power supply 36. While the present invention is not limited to the illustrated switching

mechanism 38, the illustrated switching mechanism 38 provides for fine tuned switching through the digital transistor 48, and the potential to handle higher current through the transistor 40.

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The fault monitor 26 also includes a resistor 60, and may also include a resistor 62, in series with the collector emitter 46 of the transistor 40. The resistors 60, 62 may in some embodiments provide resistance of about 330 K Ω and about 20 Ω , respectively. The resistor 62 limits the current passing through the load 16 to a level below that required to light the bulbs 20, 22, 24, thereby ensuring that the test process does not light the bulbs 20, 22, 24 at a time when they should not be lit. A capacitor 66 connected in series with the ground 68 and in parallel with both the resistor 60 and the load 16 provides for a more uniform flow of current through the resistor 60 and load 16. The capacitor 66 may in some embodiments provide a capacitance of about 0.1 μF . The diode 65 resists current flow in through the resistor 62 towards the power supply 36.

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To perform the test, the switched 12-volt power supply 59 will apply a positive potential to the input 52 of the transistor 48, thereby permitting current to flow from the power supply 36 through the transistor 48. A negative potential will thereby be applied to the input 44 of the transistor 40, thereby permitting current from the power supply 36 to flow therethrough. This current will therefore be supplied to the resistor 60 and sensor 70, and to the bulbs 20, 22, 24. As can be seen from the Figure 4, the voltage applied to both the resistor 60 and to each of the bulbs 20, 22, 24 will remain constant. However, if one or more of the bulbs 20, 22, 24 has burned out, the current will vary according to the well-known principals of Ohm's law. According to well-known principals, the bulbs 20, 22, 24 will provide a resistance equal to that of a hypothetical single resistor, designated herein as R_{eq} . The resistance of R_{eq} can be determined by the

equation: $\frac{1}{R_{eq}} = \frac{1}{R_{20}} + \frac{1}{R_{22}} + \frac{1}{R_{24}}$ where R_{20} , R_{22} , and R_{24} each denote the resistance

of the bulbs 20, 22, 24, respectively. Therefore, $R_{eq} = \frac{1}{\frac{1}{R_{20}} + \frac{1}{R_{22}} + \frac{1}{R_{24}}}$.